TechnoBend



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Company Profile



At Technobend, we specialize in High Frequency Induction Pipe Bends & BW Fittings. Our goals are simple: We will work with our customers to deliver a total & integrated solution to pipeline routing with the highest standards of safety and quality. Projects are initiated through early participation of all parties to address common issues such as design, materials selection, manufacturing procedures, & construction processes to ensure the best cost benefits & timely delivery.

The Integrity, & Safety of the product is our priority.

Web www.technobend.com



About Technobend

Our 2.7 hectare manufacturing plant is strategically located at Bogor. With our state of the art facilities, we produce corrosion protected High Frequency Induction hot bends & BW fittings. At Technobend, we are constantly challenging ourselves to achieve better project outcomes. To problems, we offer practical, smarter solutions. To customers, we offer professional, high quality, & trustworthy products and services.

We strive to provide innovative solutions to the fabrication & delivery of high integrity Induction bends & piping components for pipeline routing from upstream exploration to Petrochemical Plants, Power Stations, & Refineries.

Technobend is accredited & certified by the ISO 9001 Quality Management System, & ISO 45001 Health & Safety Management Systems.



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State of the Art Facilities

High Frequency Induction Bend & Post Bending Heating Treatment (PBHT)

Induction bending is a dynamic process and requires close control and monitoring to ensure that the dimensional effects and imparted material properties meet with agreed values. Our Manufacturing Procedure Specification is in compliance with ASME B16.49, ISO 155901, & DNV-OS-F101. They list specific codes & procedures for testing on tensile, yield strength, the toughness, & Acceptable Dimensional Tolerances after bending.

High Induction bending & Post Bending Heat treatment are an integral manufacturing processes that contribute to a high integrity Hot Induction Bend. Technobend provides FULL GUARANTEE for its workmanship, quality, & integrity of products which are our core values.







Induction Bend & BW Fittings

Pipeline routing includes a number of changes in alignment, grade and elevation. To achieve the correct pipeline position, the pipeline string can be "roped" into place with hot bends, & fittings. The selection of the appropriate mix of measures would be made on a technical and commercially expedient basis.

Induction Pipe Bend

The primary aim for any induction bend is that the end result of the integrity (mechanical properties & defects) and geometrical dimensions are achieved as agreed.

Pipe material for induction bending includes: all grades of Carbon Steels, Stainless Steels, Alloy Steels, Duplex, Incoloy, titanium, & Cladded Pipe.

Pipes manufactured as seamless or welded (HFW, SAWL, SAWH), each presenting particular technical challenges.

Piping material are selected based on the piping specifications. It may be carbon steel (CS), stainless steel (SS) or alloy steel (AS) of different grades. The following codes are used to specify the geometric, material & strength of piping & components:

B16.49	Factory-Made Wrought Steel Buttwelding Induction Bends for	
	Transportation & Distribution Sysems.	
B16.9	Factory Made Wrought Steel Buttwelding Fittings.	
B16.28	Wrought Steel Buttwelding Short Radius Elbows and Returns	
B16.11	Forged Fittings, Socket Welding and Threaded.	
B16.25	Buttwelding Ends.	

Piping codes developed by the American Society of Mechanical Engineers: codes are used for the design, construction and inspection of piping systems.

- B31.1 : Power Piping. This refers to Piping typically found in electric power generating stations, in industrial and institutional plants, geothermal heating systems and central and district heating and cooling plants.
- B31.3 : Process Piping includes selection of material, design, fabrication, assembly, erection, examination, inspection and testing.

Piping typically found in petroleum refineries, chemical, pharmaceutical, textile, semiconductor and cryogenic plants and related processing plants & terminals.

B31.4 : Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids Piping transporting products which are predominately quid between plants and terminals and within terminals, pumping, regulating, and metering stations.

B31.5 : Refrigeration Piping Piping for refrigerants and secondary coolants. Gas Transportation and Distribution Piping Systems Piping transporting products which are predominately gas between sources and terminals including compressor, regulating and metering stations, gas gathering pipelines.

B31.8 : Gas Transportation and Distribution Piping Systems Piping transporting products which are predominately gas between sources and terminals including compressor, regulating and metering stations, gas gathering pipelines.

B31.11 : Slurry Transportation Piping Systems Piping transporting aqueous slurries between plants and terminals within terminals, pumping and regulating stations.



PRODUCT RANGE & TECHNICAL DATA HOT INDUCTION BEND

Outside Diameter Range	Radiu	s Rang	e	N	laterial		Туре	
2" up to 52"	2.5D u 16 me	up to eter		Car Sta Du du	rbon steel, iinless stee plex & Sup plex	el, ber	Seamless, Welded (SAW,ERW, SSAW) & Cladded Bend	
		Acceptabl	e Dimei	nsional	Tolerances			
Max wall thinning			-	8% afte	er bending at	extrados (above 4D)	
Ovality			E	Bend Bo	ody ≤ 2.5% O	.D.		
Bend radius tolerance			F	R<1000 R≥1000	mm : ±10mm mm : ±1%			
Bend angle tolerance			E	±0.5°				
Out of Plane Angle Tolera	ince		3	±0.5°				
Linear dimensions : NPS NPS 24"	24" & small	er above	1	±5mm ±6mm				
End squareness < 36"			=	±2.4mm	1			
End squareness > 36"			=	±3.0mm				
Angle degree of Bevel			3	30° (+5°/-0°)				
Drift Tools/Gauging			9	97% of	ID			
	М	inimum Me	chanica	I Value	s Requireme	ent		
Grades	Yield Y	′s (MPa)		Mi	n Tensile (MF	Pa)	Hardness (HB)	
P290 (X42) 290 (42)				41	4 (60)		238	
P317 (X46)	317 (4	·6)		43	4 (63)		238	
P359 (X52)	359 (5	2)		45	5 (66)		238	
P386 (X56)	386 (5	6)		49	0 (71)		238	
P414 (X60)	414 (6	0)		517 (75)			238	
P448 (X65)	448 (6	5)		531 (77) 238			238	
P483 (X70) 483 (70)				565 (82) 247				
	Induction Bend Ordering Information							
Company Name				Quote				
Location				Date				
Construction code B31.4			B3	1.8	B31.1		B31.3	
- Crossification			Pipe De	scriptio	on	Others		
Process		ERW	SAW	/ Spec	SSAW	Seamle	SS	
Outside Diameter		Millimete	r (mm)		Inches			
Wall Thickness		Millimeter	(mm)		Inches	VOE	N/70	
Grade		В X46	X52	X56	X60	X65	X/0	
04.	Dedius		Send Di	mensio	ns To		alwassa Dand	
Qty	Radius	Angle (deg])	11	12	Wall this	ckness Bend	

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ASTM A234 BW Fitting

Specifications Applicable to Buttwelding Fittings

SASME/ANSI B16.9-1993 - Factory-Made Wrought Steel Buttwelding Fittings.

- ASME/ANSI B16.28-1994 Wrought Steel Buttwelding Short Radius Elbows and Returns.
- ASME B16.25 : Buttwelding Ends.

	C %	Mn %	P %	S %	Si %	Cr %	Mo %	NI %	Others
WPB	.30max	.29-1.06	.050	.058	.10min	.40max	.15max	.40max	Cu .40max
WPC	.35max	.29-1.06	.050	.058	.10min	.40max	.15max	.40max	Cb .02max
WP1	.28max	.3090	.045	.045	.10min	-	.44065	-	-
WP12 CL1 & 2	.0520	.3080	.045	.045	60max	.80-1.25	.44065	-	-
WP11 CL 1	.0515	.3060	.030	.030	.50-1.00	1.00-1.50	.4465	-	-
WP11 CL2 & 3	.0520	.3080	.040	.040	.50-1.00	1.00-1.50	.4465	-	-
WP22 CL1 & 3	.0515	.3060	.040	.040	.50max	1.90-2.60	.87-1.13	-	-
WP5 CL1 & 3	.15max	.3060	.040	.030	.50max	4.0-6.0	.4465	-	-
WP9 CL 1 & 3	.15max	.3060	.030	.030	1.00max	8.0-10.0	.90-1.10	-	-
WP91	.0812	.3060	.020	.010	.2050	8.0-9.5	.85-1.0	.40max	V .1825 Cb .0610

Mechanical Properties – KSI

Grade (ksi/MPa)	WPB	WPI	WP11 CL3 WP22 CL3 WP5 CL3 WP9 CL3	WP91	WP12 CL1	WPC, WP11 CL2,WP12 CL2
Tensile strength	60-85 (415-585)	55-80 (380-550)	60-85 415-585	85-110 (585-760)	60-85 (415-585)	70-95 (485-655)
Yield Strength	WPB	WPB	WPB	WPB	WPB	WPB

Butt Weld Fittings Specifications and Grades - B16.9 / B16.28

Materials	Specifications	Grades		
Carbon Stool	ASTM A234	WPB		
Carbon Steel	ASTM A420	WPL6, WPL3, WPL9		
		WP1, WP5, WP9,		
Alloy Steel	ASTM A234	WP11/12, WP22		
Stainless Steel	ASTM A403	TP304, TP316		
Wall Thickness	SCH. 10, 20, 30, 40, 60, 80, 100, 120, 160, STD, XS, and XXS			
Sizes	" thru 40 "			

Cap, Concentric reducer, Eccentric reducer, 90/45deg LR Elbow, 90/45deg SR Elbow, 180deg LR/SR Elbow, Straight tee, Reducing tee

Threaded & Socket Weld Forged Steel Fittings - B16.11

3000# NPT & S/W	1/4" through 4"		
3000# NPT & S/W	1/2" through 4"		
Carbon steel ASTM A105. Low temp			

ASTM A350LF2, ASTM A182-F304L/F316L

Elbow 45 & 90 Degree, Full / Half & Coupling, Tee Equal & Reducing, Nipple, Cap, Bushing, Plug (Hex Head, Round Head & Square Head), Weldolet, Threadolet, Swage Nipple, Bull Plug.



Manufacturing Procedure Specification Induction Hot Bend

Each project represents a unique set of circumstances which must be defined and a suitable Manufacture Procedure Specification (MPS) developed. Physical properties of induction bends can be demonstrated through the manufacture of qualification test bends and subsequent mechanical testing.







Heat treatment of BW Fitting

Hot-formed WPB, WPC, & WPR fittings, upon which the final forming operation is completed at a temperature above 1150°F (620°C)and below 1800°F (980°C), need not be heat treated if they are cooled in still air Cold-Formed WPB fittings, upon which the final forming operation is completed at a temperature below 1150°F (620°C) shall be normalized, or shall be stress relieved at 1100°F to 1275°F. (595 to 690°C)

Post Bending Heat Treatment (PBHT)

Post Bending Heat Treatment (PBHT) (IS) an important aspect for high frequency induction bending in achieving the result of a desired qualified hot bends. After bending, distortion occurs, leading to a corresponding drop in its mechanical properties.

Technobend has the in-house heat treatment facilities for post bend heat treatments including normalising, annealing, tempering, and quenching. Our electrical furnaces are calibrated & certified acc to API 6A.

The ASME code provides stringent guidelines & regulations on the permissible tolerances allowable to address the final desired mechanical values for a integrity bend.

All electrical furnace shall have a recording device directly attach to the electrical furnace. The furnace shall be calibrated & survey annually acc to API 6A, to maintain uniformity of heat treatment. Thermocouples shall be attached to each furnace load. The furnace shall be controlled within tolerances $\pm 15^{\circ}$ C ($\pm 25^{\circ}$ F).

Method

- (a) Stress Relieve or Temper. 480°C (900°F) and 675°C (1,250°F) and hold at temperature for at least 30min per 25mm (1 in.) of thickness at temperature, but no less than 30min.
- (b) Normalize. Heat above the transformation temperature range and hold at temperature for a minimum of 20min per 25mm (1 in.) of thickness, but no less than 20min, and allow to cool in still air.
- (c) Quench and Temper. Heat above the transformation temperature range and hold at temperature for a minimum of 20min per 25mm (1 in.) of thickness and direct quench in either water. Reheat to temper as defined above.

Valid API 6A Furnace Calibration certificate shall be attached as part of MDR.



Non-Destructive & Destructive Testing facilities

In adherence with global demand for high standard set down by the industry, Technobend provides a comprehensive in-house testing facilities to identify any hidden indication of potential flaws.

Our Quality Control Management incorporates a statistical process control, audit, with full traceability & identification system. Each product has its own identity, beginning from the front end cutting to the final product with stringent guidelines that define each piece down to the finest detail.

TESTING FACILITIES

Non-Destructive Examination	Destructive Examination
Dimension, Drift test, & Visual	Tensile & Yield Test
Penetrant (PT) , & Magnetic Particle (MPT)	Charpy impact test
Utrasonic (UT), Hardness test	Metallographic test
Radiography (RT)	Guided or Weld bend test
Positive Material identification (PM)	Hydrogen induced cracking test (HIC)
Hydrotest	Sulphite stress cracking test (SSC)

Non-Destructive Examination (NDE)



Destructive Examination

Destructive testing of specimen for pregualification at the laboratory is designed to produce consistent & repeatable result as representative of others that are manufactured with similar process will produce similar results. The objective is to ensure that our products will perform safely under extreme stress, high temperature, & extreme conditions.

Once qualified & approved, these parameters must be set as the target parameters for all subsequent production bends. The production motherpipe would be prepared and inspected and then induction bent as "clones" of the approved procedure. The completed bends would be machined with bevel ends, tested and inspected, coated as specified and labeled. Documentation would be assembled into a consolidated manufacture data report detailing all aspects of manufacture, testing, and inspections.

Location of Specimens

- Tensile Test
- Minipact Test
- ☑ Hardness Test
- Corrosion Test
- Metallography
- Guided Bend Test
- Chemical Analysis







Coating as a package under one stop warranty

Technobend provides an integrated innovative engineering solution to induction bending & forming, with anti corrosion coating, & offshore painting in one package under One Warranty.





FBE+PE Powder Coating



Hot applied Heat Shrink Sleeve & Heat Shrink Tape

Field and Laboratory Tests available at Technobend

V	Holiday Test	R	Flexibility Test
V	Visual and Thickness Check	V	Cathodic Disbondment Test
R	Impact Test	V	Hot Water Immersion Test
V	Peel Adhesion Test	V	Degree of Cure (DSC)
R	Indentation Test	Ø	Air Entrapment
R	Elongation at Break		



Packaging and Marking





Manufacturing Data Record (MDR)

Documents submission for test bend & production bends after bend production.



V	Mother Pipe Mill Certificate	✓ Inspection Test Plan (ITP)
V	Incoming Pipe Inspection Report	
V	Material Mill Certificate of Bend EN 10204 3.1	Report of PQT Bend (Hot Bend report, PBHT, NDE, Hydrotest, & Mechanical test)
R	Manufacture Procedure Specification (MPS)	
V	Valid Furnace Calibration Certificate acc to API 6A	Production Test Report (Hot Bend report, PBHT, MDE, & Bevelling Report)

Applications & Project References

Our years of experiences & technology knowhow in this demanding industry has earned us the vote of confidence from our customers. Our reputation is built on our dedication, competency, & responsive problem solving abilities. These are the qualities that we draw from our years of experience in project management. We will strive to uphold this high standard for QUALITY & SAFETY.



Offshore Platform





Onshore Pipeline

TechnoBend7

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ISO 9001 : 2015



ISO 45001 : 2018

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We are dedicated to providing our clients with engineered solutions that ensure the quality and integrity of our products with optimal cost efficiency.

TechnoBend